

AMENDMENTS TO THE CLAIMS

Claims 1-24. (Canceled)

Claims 25-47. (Canceled)

48. (New) A component mounting method comprising:
image-picking up a camera reference mark by a board recognition camera that is provided for a component placing head having a component holding member holding an electronic component, and is to image-pick up a board mark on a circuit board, said camera reference mark being

- (i) provided upright on a chassis individually of both an X-Y robot, having the component placing head, and a component recognition camera that is for picking up an image of the electronic component held by the component holding member,
- (ii) arranged adjacent the component recognition camera,
- (iii) positioned in a location where image-pickup of the electronic component by the component recognition camera is not disturbed, and
- (iv) provided at a height position that is the same as a height position of the circuit board when the board recognition camera picks up an image of the board mark, and the same as an image-pickup height position of the component recognition camera;

obtaining relative positional relations among the component holding member, the board recognition camera, and the component recognition camera from central positional information of the component holding member, obtained by image-picking up the component holding member by use of the component recognition camera, and image-pickup information obtained by image-picking up an image-pickup mark, provided at the image-pickup height position of the component recognition camera, by use of the component recognition camera and the board recognition camera;

for a positional relation between the component holding member and the board recognition camera, from among the relative positional relations, ignoring an amount of displacement between the component holding member and the board recognition camera attributed to heat;

using displacement information of the camera reference mark, obtained by image-picking up the camera reference mark by use of the board recognition camera, as information of a relative displacement between the board recognition camera and the component recognition camera;

based on only the displacement information, correcting a placing position, on the circuit board, for the electronic component;

moving the component placing head in mutually perpendicular directions so as to move the component holding member such that the electronic component is moved to the placing position so as to be placed onto the circuit board;

recognizing placing region reference marks arranged at regular intervals on a placing region reference mark recognition reference board held by a board holding device while the placing region reference mark recognition reference board is positioned in a component placing region, and then obtaining positional coordinates of each recognized placing region reference mark;

obtaining numerical control (NC) coordinates of positional coordinates of at least two board reference position calculation marks of a component mounting circuit board;

extracting placing region reference marks, located near the at least two board reference position calculation marks, from among the recognized placing region reference marks;

obtaining an offset value for each placing region reference mark by subjecting the positional coordinates of each extracted placing region reference mark to coordinate transformation so that a correction value of said each extracted placing region reference mark becomes zero or substantially zero;

recognizing at least two board reference position calculation marks of the component mounting circuit board when held by the board holding device in the component placing region

in place of the placing region reference mark recognition reference board, and then obtaining positional coordinates of the recognized at least two board reference position calculation marks;

correcting the NC coordinates of the at least two board reference position calculation marks based on the obtained positional coordinates of the recognized at least two board reference position calculation marks;

performing correction of positional coordinates of a component placing position, of the component mounting circuit board, based on an offset value of a placing region reference mark that is located nearest to a recognition camera provided for a component holding head when a component held by the component holding head is positioned above the component placing position; and then

placing the component in the component placing position based on the corrected positional coordinates of the component placing position.

49. (New) The component mounting method according to claim 48, wherein obtaining the offset value for each placing region reference mark by subjecting the positional coordinates of each extracted placing region reference mark to coordinate transformation so that the correction value of said each extracted placing region reference mark becomes zero or substantially zero, comprises obtaining the offset value for each placing region reference mark by subjecting the positional coordinates of each extracted placing region reference mark to coordinate transformation, by rotating and shifting a graphic line that interconnects said each extracted placing region reference mark, so that the correction value of said each extracted placing region reference mark becomes zero or substantially zero.

50. (New) The component mounting method as claimed in claim 48, wherein obtaining the offset value for each placing region reference mark by subjecting the positional coordinates of each extracted placing region reference mark to coordinate transformation so that the correction value of said each extracted placing region reference mark becomes zero or substantially zero, comprises

(i) calculating a correction value in at least one of an X-direction of the board holding device and a Y-direction, perpendicular to the X-direction, of said each extracted placing region reference mark,

(ii) obtaining an inclination of said placing region reference mark recognition reference board, and

(iii) subjecting the positional coordinates of said each extracted placing region reference mark to coordinate transformation such that the correction value as calculated becomes zero or substantially zero.